What is claimed is:

1. A method for determining a bandwidth required for meeting one or more quality-of-service ("QoS") criterion on a transmission link comprising the steps of:

generating a plurality of streams of traffic for the transmission link;

conducting a plurality of simulations of bandwidth for the link, based on generated traffic streams and using systematically varying values of the one or more QoS criterion;

developing a model addressed to a relationship between bandwidth and the one or more QoS criterion based on the simulations; and

applying the developed model to determine bandwidth required to meet the one or more QoS criterion on a link.

2. The method of claim 1 wherein each of the generated traffic streams has a fixed traffic bit rate and the traffic bit rate varies from stream to stream.

3. The method of claim 1 wherein the streams of traffic are organized into packets and the traffic streams are defined by packet arrivals and sizes.

4. The method of claim 1 wherein the traffic streams are generated synthetically based on a statistical model.

5. The method of claim 4 wherein the statistical model is a Fractional Sum Difference model.

6. The method of claim 1 wherein the step of conducting plural simulations includes the sub-steps of:

choosing a trial bandwidth for a given simulation; and

iteratively repeating the simulation with an incremental change in the trial bandwidth until a QoS value realized for the simulation substantially matches a selected QoS criterion.

7. The method of claim 1 wherein the developed model is of the form:

$$\log_2\left(\frac{u}{1-u}\right)=\mu+o_\delta\log_2(\delta)+o_\omega(-\log_2(-\log_2(\omega)))+\in,$$

where u is the QoS utilization, δ is the queuing delay, ω is the delay probability, $\in$ is a random variable with mean 0 and variance $\sigma^2(\in)$, μ is a constant for a given traffic stream, serving as a summary of the statistical properties of the stream, and o_δ and o_ω are empirically determined constants.

8. The developed model of the form claimed in claim 7 wherein:

$o_\delta \cong 0.379$, $o_\omega \cong 0.863$ and $\sigma^2(\in) \cong 0.113$

9. The developed model of the form claimed in claim 7 wherein:

$$\mu=o+o_\tau(\log_2(\tau)-24)+\zeta$$

where ζ is a random variable with mean 0 and variance $\sigma^2(\zeta)$ and o and o_τ are empirically determined constants.

10. The developed model of the form claimed in claim 9 wherein:

$o \cong 5.500$, $o_\tau \cong 0.709$ and $\sigma^2(\zeta) \cong 0.036$

11. The method of claim 1 wherein the developed model is of the form:

$$\mathrm{logit}_2(u)=o+o_\tau\tau+o_\delta\log_2(\delta)+o_\omega(-\log_2(-\log_2(\omega)))+\psi,$$

where u is the QoS utilization, τ is the link bit rate, δ is the queuing delay, ω is the delay probability, $\psi = \in + \zeta$ is a normal random variable with mean 0 and variance $\sigma^2(\psi)=\sigma^2(\in)+\sigma^2(\zeta)$ and o, o_τ, o_δ and o_ω are empirically determined constants.

12. The developed model of the form claimed in claim 11 wherein:

$o \cong 5.500,\ o_\tau \cong 0.709,\ o_\delta \cong 0.379,\ o_\omega \cong 0.863$ and $\sigma^2(\psi) \cong 0.119$

13. A method for determining a QoS utilization as a function of queuing delay and delay probability for a traffic stream, the method comprising a model of the form:

$$\log_2\left(\frac{u}{1-u}\right)=\mu+o_\delta\log_2(\delta)+o_\omega(-\log_2(-\log_2(\omega)))+\in,$$

where u is the QoS utilization, δ is the queuing delay, ω is the delay probability, $\in$ is a random variable with mean 0 and variance $\sigma^2(\in)$, μ is a constant for a given traffic stream, serving as a summary of the statistical properties of the stream, and o_δ and o_ω are empirically determined constants.

14. The model of the form claimed in claim 13 wherein:

$o_\delta \cong 0.379,\ o_\omega \cong 0.863$ and $\sigma^2(\in) \cong 0.113$

15. The model of the form claimed in claim 13 wherein:

$$\mu = o + o_\tau(\log_2(\tau) - 24) + \zeta$$

where ζ is a random variable with mean 0 and variance $\sigma^2(\zeta)$ and o and o_τ are empirically determined constants.

16. The model of the form claimed in claim 15 wherein:

$o \cong 5.500$, $o_\tau \cong 0.709$ and $\sigma^2(\zeta) \cong 0.036$.

17. A method for determining a QoS utilization as a function of queuing delay and delay probability for a traffic stream, the method comprising a model of the form:

$$\mathrm{logit}_2(u) = o + o_\tau \tau + o_\delta \log_2(\delta) + o_\omega(-\log_2(-\log_2(\omega))) + \psi,$$

where u is the QoS utilization, τ is the link bit rate, δ is the queuing delay, ω is the delay probability, $\psi = \in + \zeta$ is a normal random variable with mean 0 and variance $\sigma^2(\psi) = \sigma^2(\in) + \sigma^2(\zeta)$ and o, o_τ, o_δ and o_ω are empirically determined constants.

18. The model of the form claimed in claim 17 wherein:

$o \cong 5.500$, $o_\tau \cong 0.709$, $o_\delta \cong 0.379$, $o_\omega \cong 0.863$ and $\sigma^2(\psi) \cong 0.119$